



#

# SEQUENCE LISTING

<110> Lee, Ike W.  
Izumo, Seigo

<120> Cardiac-Cell Specific Enhancer Elements  
and Uses Thereof

<130> 01948/069002

<140> US 09/761,466

<141> 2001-01-16

<150> US 60/176,419

<151> 2000-01-14

<160> 20

<170> FastSEQ for Windows Version 4.0

<210> 1

<211> 375

<212> DNA

<213> Mus musculus

<400> 1

|            |            |            |            |            |             |     |
|------------|------------|------------|------------|------------|-------------|-----|
| aggccccccg | caccctcatc | ctgggtcccc | ccccctctct | ccaccctccc | ggaccacctaa | 60  |
| aggggcgggc | gggccaagc  | cgagggcgct | gcgcctgacc | ccgagcggaa | gggccccagt  | 120 |
| ctaggtccta | atgcgggtgg | cgtctccttt | gacaggcggc | gtttggggac | aacagcgggg  | 180 |
| acgagagata | aggtgacata | ccagagcaga | tttgggtgcg | gcgctgatac | tcctctcccg  | 240 |
| acaggaaacg | cggagctatt | taaaagacct | tatcgattac | tttatctttc | ctggaaaagct | 300 |
| tcttgcgagg | agacaaaaga | tggtccctgc | ctaaagacac | aaggccacac | aacggagggt  | 360 |
| ctgcacaggc | gacgc      |            |            |            |             | 375 |

<210> 2

<211> 51

<212> DNA

<213> Mus musculus

<400> 2

|            |           |            |            |            |   |    |
|------------|-----------|------------|------------|------------|---|----|
| tgctcctttt | aagggttga | atgtctgcaa | ctgtcatgtg | tacacttaaa | g | 51 |
|------------|-----------|------------|------------|------------|---|----|

<210> 3

<211> 1072

<212> DNA

<213> Homo sapiens

<400> 3

|            |            |            |            |            |             |     |
|------------|------------|------------|------------|------------|-------------|-----|
| aggccccccg | caccctcatc | ctgggtcccc | ccccctctct | ccaccctccc | ggaccacctaa | 60  |
| aggggcgggc | gggccaagc  | cgagggcgct | gcgcctgacc | ccgagcggaa | gggccccagt  | 120 |
| ctaggtccta | atgcgggtgg | cgtctccttt | gacaggcggc | gtttggggac | aacagcgggg  | 180 |
| acgagagata | aggtgacata | ccagagcaga | tttgggtgcg | gcgctgatac | tcctctcccg  | 240 |
| acaggaaacg | cggagctatt | taaaagacct | tatcgattac | tttatctttc | ctggaaaagct | 300 |
| tcttgcgagg | agacaaaaga | tggtccctgc | ctaaagacac | aaggccacac | aacggagggt  | 360 |
| ctgcacaggc | gacgcacaat | tcggcgcggg | gaaagcaaaa | acacactgac | gcttagagtg  | 420 |
| cacaaacgtg | tgtgttccca | gagcagctcc | agagtgcggc | agggacgctg | ggggcgggca  | 480 |
| ggggcaccca | cagtatggtc | ttctgtgccc | ttggaaagtt | ttttttcacc | gtatgcgcgt  | 540 |

BEST AVAILABLE COPY

|            |            |            |            |             |            |      |
|------------|------------|------------|------------|-------------|------------|------|
| aaaacacgca | cacacagaga | aagtgactgt | gcacttaggg | cgctgtgtg   | tacccgtgtc | 600  |
| gttttagcga | atttaaagca | catcaggccg | ggcgccatgg | ctcacgectg  | taatcccagc | 660  |
| actttaggag | gccgagggcg | gccgatcacc | tgaggtcggg | agttcgacac  | cagcctggcc | 720  |
| aacatggtga | aaccctgtct | ctacaaaaaa | tacaaaaatt | agccgggcat  | ggtgatgcgt | 780  |
| gcctgtgatc | ccagctactc | gggaggtctg | ggcaggagaa | tcgcttgaac  | ccgggagggc | 840  |
| gaggttgacg | tgagccgaga | tcacaccact | gcactccagc | ctggggcgaca | agagcgaaat | 900  |
| tccgtctaaa | aaaataaaa  | aaaataaaat | gataattaag | cccatcaact  | cacattcaaa | 960  |
| gcggttactg | gtgggtgtaa | tgtatccata | gacacaggtc | taaaatgtaa  | acgctccatt | 1020 |
| gtgctccttt | taagggcttg | aatgtctgca | actgtcatgt | gtacacttaa  | ag         | 1072 |

<210> 4

<211> 7838

<212> DNA

<213> Homo sapiens

<220>

<221> misc\_feature

<222> (1)...(7838)

<223> n = A,T,C or G

<400> 4

|             |             |            |            |             |            |      |
|-------------|-------------|------------|------------|-------------|------------|------|
| ctcgagccca  | ggagttcaag  | accagcctgg | gaaacatagg | gagacccctc  | tctctccaca | 60   |
| aaaaatttaa  | aaactagcca  | ggtgtggtgg | caaacacctg | tagtcccagc  | tactcagaag | 120  |
| gctgaggtgg  | gaggatcact  | tgagcctgga | aagtagaggc | tacagtgagc  | cgtgatcaca | 180  |
| ccactgcact  | ccagcctggg  | agacagagtg | agaccctgtc | aaataaataa  | acaaacaaat | 240  |
| aatgattaaa  | ataactaaaa  | ctaattttat | gctattttca | ccttgtattt  | tgtaaagatt | 300  |
| tttaaaatga  | aaattcccaa  | attgctttcc | agaaggattg | ttcaaaatta  | taccacattt | 360  |
| tcactcatgt  | tctcttcctg  | aacagcagca | atcaggaaaa | actccctgga  | agaggcaggg | 420  |
| cttagactga  | gatttttaaaa | gggggtaggc | ctcagctctc | cttcaggtt   | tacactgtgc | 480  |
| atgtttccaa  | actcaaagaa  | tttacctct  | tctggttgca | ttgctctgta  | aagatctgac | 540  |
| ccactactat  | gtatttaaaa  | gggatgcatg | ataatgaatt | cagccctctc  | tgtaaaatcc | 600  |
| aaagggctct  | attgcagttt  | ccccatttta | atgggtcatt | aaaatattct  | tgggaaggac | 660  |
| aaagcttttag | ttaactatga  | gaaaaacaag | cagaaccagc | cctggattct  | gtcttcaaag | 720  |
| attttaccat  | gttggcaggc  | ctggtagtc  | agagcccaag | aaaatatccc  | agccacagat | 780  |
| accctagatg  | tagactagca  | gtgctacaac | ctcaaggtea | gaagtatgtc  | actagaccag | 840  |
| agccataaaat | aggtgctata  | tcattaagag | agtaaaaatg | caaaccacag  | acagggtgac | 900  |
| attattcaca  | ataagcatat  | aaccacaggg | ggactcctat | ctgaatatgc  | aaagaactct | 960  |
| cactaatcaa  | taagaaaaag  | gcaaaagatt | taaacaggca | cttcacaaaa  | aaagtatat  | 1020 |
| caaaaaatca  | ataaacattt  | gaaaagatcc | tcaattcact | agttattagg  | gaaaggtgaa | 1080 |
| ataaaaccac  | aatgagacac  | ccccacgccc | ccaccagaac | ggcttaaaat  | ctaaaaatg  | 1140 |
| taataccgaa  | tgtttgcaag  | gatgcggaga | aactgccatt | tttgtacact  | gccagtatga | 1200 |
| gggtaaatct  | gtacaaccag  | ggtggaaaac | gctgagtaga | atgtactcta  | gctggatttg | 1260 |
| tgaatatcat  | atgatccagc  | aattctactc | ctagaaattt | acccaacaga  | aatgtgtaaa | 1320 |
| catgttcacc  | aaaagacaca  | cgcaagacaa | ttcatagagg | cactcactat  | tcctaacagt | 1380 |
| caaaaactgg  | aaactaccca  | aatgtccatc | agcagagaat | ggcgataaac  | agtagcatct | 1440 |
| tcacataatg  | aaatgtttcg  | acagcaatga | aaagtagcta | gctacaacta  | caaacaatgt | 1500 |
| gattgaacct  | cacaaacata  | tactaagtaa | aattatcaga | cacaaagagt  | gtatatactg | 1560 |
| tatttagata  | catgtgaagt  | ctgaaaacag | gcaaaactat | tctgttggtta | gaagtcagaa | 1620 |
| tagttactgc  | cctgccggga  | aacagaactc | aagagggctt | agtagctact  | ggtaatgttc | 1680 |
| tgcttcctga  | actgcatgct  | agtgaggcag | ctgttatatt | gtgcagtcct  | gtgttacact | 1740 |
| ggagttaaaa  | gttcccccaa  | aatcagaaag | tgttcagcaa | gtggaagcaa  | gtacactgct | 1800 |
| ggacttggct  | gggaacttag  | gggatcccat | aatttgtcac | aggcacaagc  | aaagccagct | 1860 |
| ttcttgccnt  | aagtagcate  | tcccagagtc | aggatccagg | aatgggttgg  | caggcaggat | 1920 |
| gcaaggcagg  | attcgggagt  | ggctgagagt | tttcccagtg | ccacctgggtc | ccacctcccc | 1980 |
| tctcccactt  | ctaatagaacg | ggcagtacag | cttctgttag | gaaaagagcc  | tgggtcccta | 2040 |
| ggcgatgact  | gtcacatcta  | gggagagggc | gatgcactgg | ggtcctcacc  | tacaccccc  | 2100 |
| ttggctgtct  | caccactctg  | aattataaat | gcccggactt | cctcatctcc  | caccacacac | 2160 |
| tcttgttaga  | agaaaagaaa  | cgaatctccc | agggtcctt  | ctaacaaaag  | tgttcattca | 2220 |

|             |             |             |             |             |             |      |
|-------------|-------------|-------------|-------------|-------------|-------------|------|
| gagtagccct  | gcttgagggc  | ccctggcctg  | gaggagtggg  | agaggcagcc  | ctccccctcc  | 2280 |
| aggagagtca  | tctccagggc  | taccagggac  | tgagtaacta  | ggtcaccaga  | gtaacccaaag | 2340 |
| aggcaggaga  | caagggcatt  | caagcattgg  | gccaggaatg  | gaggggtgatg | tccagttcat  | 2400 |
| gtttctctgg  | ttccagcata  | gcacacgggtg | caaatgaacc  | atcatgcaag  | aaaacacagc  | 2460 |
| tagtctccct  | tctccacca   | gcaacctttg  | gttactgata  | ataatcaa    | tcactat     | 2520 |
| tttttttttt  | taactaaggc  | tgagataatg  | tcaaaggacc  | acagggaata  | ggaaggccta  | 2580 |
| aaccaagggc  | ttaaagaatg  | agaagaagat  | tcattcaaaa  | aagcctccta  | agggaggaag  | 2640 |
| atgtttttcc  | ctcctttact  | tttctacagt  | aattttttatt | ttggataaat  | aaacctgat   | 2700 |
| aaatgagaac  | ccacgctttc  | ccaaggccag  | gctgtgtttt  | ggtgggtggg  | cctccgtcag  | 2760 |
| cagttggagt  | aatccagagt  | gatcccgggc  | aagtcggaag  | ggagcaagtc  | tgtgttgaag  | 2820 |
| ccaagaggta  | tctttcccta  | cagcttctca  | agagagggga  | tccccgtggg  | taattgtgag  | 2880 |
| gctggaaaca  | ccgagaggct  | gactcccatg  | tttatagagg  | tcattgatgg  | gtttgtgcat  | 2940 |
| ggaaggcagg  | aggagactga  | gagtgttttg  | ttattgttat  | ttggttttatt | tttattttta  | 3000 |
| aaaaactgga  | tcagccgact  | ttgaatacag  | aaaatgaaaa  | atgaggagat  | ttgcataaca  | 3060 |
| gcgcttggac  | gtctgaaggg  | gcccagggcc  | tagcggctgg  | tggggcacct  | agaaacactt  | 3120 |
| ctgcctgcag  | atcgcgagg   | gttagccaca  | ggaaggggtc  | gcctaggctg  | gccacagggc  | 3180 |
| ctttgtctgt  | actgaaggac  | cagccttggc  | ggcaccttct  | ttccccctctg | ccctgcactc  | 3240 |
| cggccccgcc  | ggagtccagag | ctgacttgct  | gcaggttggg  | gagaggacag  | aggctaggac  | 3300 |
| ggtggcgaaa  | cctcacctcg  | tcgcagtcgg  | gaagtgaaac  | ttggaccctg  | caggcacttc  | 3360 |
| ctaaagtcca  | agctgcctc   | tctgaagaat  | aaacctgatt  | ttcctccgga  | cgcggacaaa  | 3420 |
| ggaggattcg  | ctcacaacta  | gcctgtaaca  | aagattccct  | attttcgtgg  | ttaggaaaaa  | 3480 |
| aaaaaaaaaag | gaagccctcc  | gggagagaca  | tgcgccctaa  | tatttctccc  | agatgggccg  | 3540 |
| ggttcaagcg  | cgtttgagag  | tttgtctctc  | taccagcctc  | gggttctagg  | ccccccgcac  | 3600 |
| cctcatcctg  | gtccccggcc  | cttctctcca  | ccctcccgga  | cccctaaagg  | ggcggcgggg  | 3660 |
| cccaagccga  | gggcgctcgg  | cctgaccccg  | agcggaaagg  | ccccagtcta  | ggtcctaattg | 3720 |
| cgggtggcgt  | ctcctttgac  | aggcggcggt  | tggggacaa   | agcggggacg  | agagataagg  | 3780 |
| tgacatacca  | gagcagattt  | ggtgcgcgcg  | ctgatactcc  | tctcccgaca  | ggaaacgcgg  | 3840 |
| agctatttta  | aagaccctat  | cgattacttt  | atctttctctg | gaaagcttct  | tgcgagagaga | 3900 |
| caaaagatgt  | tccttgcccta | aagacacaag  | gccacacaac  | ggaggggtctg | cacaggcgac  | 3960 |
| gcacaaattcg | gcgcggggaa  | agcaaaaaaca | cactgacgct  | tagagtgcac  | aaacgtgtgt  | 4020 |
| gttcccagag  | cagctccaga  | gtgcggcagg  | gacgctgggg  | gcggcgaggg  | gcacccacag  | 4080 |
| tatggtcttc  | tgtgcccttg  | gaaagttttt  | tttcccgta   | tgcgcgtaaa  | acacgcacac  | 4140 |
| acagagaaaag | tgactgtgca  | cttagggcgc  | ctgtgtgtac  | ccgtgtcgtt  | ttagcgaatt  | 4200 |
| taaagcacat  | caggccgggc  | gccatggctc  | acgcctgtaa  | tcccagcact  | ttaggaggcc  | 4260 |
| gaggcgggccc | gatcacctga  | ggtcgggagt  | tcgacaccag  | cctggccaac  | atggtgaaac  | 4320 |
| cctgtctcta  | caaaaaatag  | aaaaattagc  | cgggcattgt  | gatgcgtgcc  | tgtgatccca  | 4380 |
| gctactcggg  | aggctgaggg  | aggagaatcg  | cttgaaccgc  | ggaggcggag  | gttgcaagtga | 4440 |
| gccgagatca  | caccactgca  | ctccagcctg  | ggcgacaaga  | gcgaaattcc  | gtctaaaaaa  | 4500 |
| ataaaataaaa | ataaaatgat  | aattaagccc  | atcaactcac  | attcaaagcg  | gttactgggtg | 4560 |
| ggttgtaatgt | atccatagac  | acagggtctaa | aatgtaaacy  | ctccattgtg  | ctccttttaa  | 4620 |
| gggcttgaat  | gtctgcaact  | gtcatgtgta  | cacttaaagt  | atgggatgtg  | tcaacacgac  | 4680 |
| cctttctagc  | gcgctcgttt  | cgtgtctgaa  | tccccgatt   | tcgccaattt  | gcttggagcg  | 4740 |
| cagaacgccc  | tccgcgaaag  | gcggctgctg  | atccccgactt | tgtccggta   | tcgcgagct   | 4800 |
| tgttggcctc  | cgggtcccc   | gtgccatgcc  | cccgggaggg  | tctccacaga  | caccgcttgc  | 4860 |
| gccgaattat  | acgagactga  | atgggttttt  | ttggtgtgtg  | tgtgcaacac  | aacaatttgt  | 4920 |
| cagctgctgt  | tcacaatgcg  | ctccgcgggg  | cgggtgaaac  | ttggctgagg  | taacgcacag  | 4980 |
| caggttggag  | ggcacgacct  | ggaaggaagg  | aagaggcgag  | gagggaaagg  | cggcgacct   | 5040 |
| aggcccgctg  | gccagccgtt  | tccagcatca  | attcagcact  | gagccggccg  | cagcagcaca  | 5100 |
| gggctggggg  | ctcccggaag  | ttcgggccagc | cggggttttg  | gccagagccg  | cggaggctgc  | 5160 |
| ccggtggtag  | gtgcgactct  | tcacctctcc  | ggggagcggc  | ggccgacgac  | ccaaccacc   | 5220 |
| cgcaagcgt   | gccgtcggcc  | cggctggctc  | cccgcgcggg  | cacaaaaaca  | ggcggcagtt  | 5280 |
| cgcagctct   | cttttcccaa  | acctgaaccg  | ccaagccgaa  | ggttcttcca  | aagtcgcggg  | 5340 |
| tccccgggct  | tcacaccgcg  | cgggcaggcg  | gaaaccagcc  | ccaggacaac  | cattttcctc  | 5400 |
| ttcactgtat  | ctgagtcggt  | gtccatctga  | ctcgaatgtc  | acctgat     | cccagctgtg  | 5460 |
| acctccagcg  | acgggactcc  | gaggaactga  | ttccagcgtc  | tcgattctct  | ccgcctctcc  | 5520 |
| gcccggtttt  | gctgaagcgg  | tttgagcccg  | tcggggcaga  | aggggtggga  | tgtggcagcc  | 5580 |
| accagcccca  | gcccagagaa  | gaaaagagga  | cgaatttaac  | gcgaaaggac  | accggaagtc  | 5640 |
| tgaaagcgac  | tcctcgggat  | cctcggaatc  | cagggcaaac  | cctaactacta | gtttgaaagc  | 5700 |

|            |             |             |            |             |             |      |
|------------|-------------|-------------|------------|-------------|-------------|------|
| ggatcatatc | cactaatcca  | ggacaaatcc  | gggttgggaa | acatactccc  | cagagcctaa  | 5760 |
| gaaaactgac | ttacaacaaa  | acaaaactga  | caaggacaaa | atgcaaagga  | gtttgtgaaa  | 5820 |
| cgtaattgct | ctcagaaaaat | atgtgtatat  | atatacatcc | tataatatgt  | tttaaatttg  | 5880 |
| caaaaaaaaa | gtctctaaga  | ggatatattt  | ttaaaaccag | tggcagcttg  | ggagggagtg  | 5940 |
| gggattagct | gagaagggga  | gaaggaaagca | tttttgaggt | gacgtaaatg  | tttttgtatc  | 6000 |
| ttgattatgg | tggctgttat  | gggggtgcac  | atccaagtgt | caagactcat  | cgaactgtac  | 6060 |
| acttttgttc | taggtacatt  | agacctcaat  | aaagtggatt | ttaaacctaa  | ataagccagg  | 6120 |
| taacagcttt | gcctgggtgg  | ctgggggaga  | ggcttgggac | actttacatt  | gatctccctc  | 6180 |
| ttaggcattg | tcgttttggg  | ttggttttgt  | tcttatgatg | tattatttat  | tcaaaaatat  | 6240 |
| atcattagca | gagtgactga  | tgtaaatgta  | aaaccattgt | taaggaaacc  | aacaaaagcg  | 6300 |
| ggaacaagag | acactggtgc  | atcctgttag  | agggataaga | ataagcactc  | gctgtccaag  | 6360 |
| ctcataaaa  | attttgggaa  | tgaatgtcgt  | tccgctttgt | ttttttgggt  | tttttgcctc  | 6420 |
| tgtgtttaac | atcaacgaga  | aatgaggacc  | caaaacttat | ccagtgggta  | cgtgtgggtg  | 6480 |
| gtgtggctgt | catctccttg  | ggactggcta  | ctgaaggcca | caggcgtggg  | aggaccaa    | 6540 |
| gctccctgga | tgttgagtec  | cagccggtaa  | gcagcacaca | gtcccgttg   | cagcaaagat  | 6600 |
| gtggtggcgg | gctgcgctgt  | gggggaaggc  | caggcccggg | caggaaacct  | agatctcacc  | 6660 |
| ggcggatgag | agtgggtgcc  | cctgcagctg  | gagtcctctg | tggcctgaga  | gctccagctg  | 6720 |
| tgccaccgtt | gggcagaccc  | cacacttcag  | ggagctgcca | ggatcagtgg  | ctacaagagt  | 6780 |
| ccccaccgtg | tttgagaaaa  | ctaggtatga  | aattattcca | tttacacccc  | taccctggcc  | 6840 |
| ccagacagga | aagtcacttc  | aaccttggtt  | ggtcagattc | cagatctggg  | tcagatgcag  | 6900 |
| ggctatttca | gagagatttt  | tagaggctga  | ctctcaggag | agggaaaggc  | agtgggctga  | 6960 |
| aggccagggg | tcaggaaatc  | taggaactgc  | taaactcctc | tgtctggcctg | cggggagcgc  | 7020 |
| ccgggtgggg | ctaccaaggc  | cacaagccag  | ttccatcttc | ccactttgcc  | accttctcac  | 7080 |
| agggaccagg | ctctgcaccc  | tcagtgacca  | caagacttgg | gcctgcccctc | tagtttgtct  | 7140 |
| atacctgccc | cctcccttga  | ctcatactgt  | ccaagacccc | aagaccaa    | cacaagtcag  | 7200 |
| gagagatctt | gagggcagcc  | agtgccacca  | gggtcctgtt | cccaggta    | actagacaaa  | 7260 |
| ggccaccctt | cctcccctct  | ctctagggct  | cgcgtgacca | ccctgcacag  | tcttctctaca | 7320 |
| ccaagggctc | cgggtgccacc | ccttcacaga  | gagttcactg | caccgctgct  | tcggctgcct  | 7380 |
| gtctcaaacc | atacacacac  | ctttgattct  | taaactccaa | gattaggatg  | ggccccagaa  | 7440 |
| atctgcattt | ttaatatgta  | cctcagagga  | ttctggccta | gatatttcta  | cagccccaaa  | 7500 |
| agtaacaagg | aacctgttcc  | aaaaagtgtg  | ttacggaaac | tgtcatgttt  | attcttgact  | 7560 |
| tgccccccaa | ttattcttcc  | cctgaagtgt  | tcatacccaa | aaaaccccac  | atgtgaacca  | 7620 |
| tatgtgtaca | tatgcccata  | tttaaaatac  | aaattctgca | cctggtttgc  | tattttaaagt | 7680 |
| atctcaaaac | atatccataa  | gaatacatat  | gaatggaact | aattctttct  | catgggatat  | 7740 |
| gggatctgtt | ctatggacaa  | cataattttt  | aaccagtctt | agtatatata  | cactggtttt  | 7800 |
| ttacatgttg | atcttaaaaa  | ataaaaacgg  | ntgaaann   |             |             | 7838 |

<210> 5  
 <211> 6751  
 <212> DNA  
 <213> Homo sapiens

<220>  
 <221> misc\_feature  
 <222> (1)...(6751)  
 <223> n = A,T,C or G

|             |             |            |            |            |            |     |
|-------------|-------------|------------|------------|------------|------------|-----|
| <400> 5     |             |            |            |            |            |     |
| caattttctat | tnagttctat  | taaaagggat | tttttttnaa | ctcactggna | accaggagga | 60  |
| ctgnaaaagaa | aagtgaaatg  | gctctgggac | tttctcteta | ggagaccagc | atgggtcgcc | 120 |
| ccaatttttta | ttttgcacgt  | atttgtccgt | ttttgcccc  | tctcctctct | cctgaaacac | 180 |
| caagacctttt | ttggaagcca  | agagaaatca | ttaccggatt | cacaaagagc | atagagagtg | 240 |
| taacagtcac  | tgatcttgtt  | caaataggga | gagttttttt | tccttccctt | tttgtaacac | 300 |
| ctgacccaca  | ggactgacag  | ttctaggaag | cccccttacc | cgaaaatagg | aaataaatcc | 360 |
| ttgccaccctt | gatttgcgaag | ggcaatgcta | atttttttct | ttctccagag | ctctcaaaaa | 420 |
| aaaaaaaaaaa | aaaaccttac  | taaaaacagg | gatcccgat  | gtagcctcga | tgtcccccat | 480 |

|             |             |             |             |             |             |      |
|-------------|-------------|-------------|-------------|-------------|-------------|------|
| taaacggtaa  | tatttcaggc  | gtccgctcac  | actaatcttt  | caaactgtca  | tgcgagccg   | 540  |
| cctggccagc  | agattcactt  | aacagcgctc  | ccaggaccct  | cgttccgagc  | tcttttcagc  | 600  |
| gagacattta  | attgaatcgg  | atgtggctcg  | tttgccagac  | gtcaccgcct  | cggcgatagg  | 660  |
| catcctctcc  | aacgacaccc  | cccccgccc   | gcgctcgaaa  | acaatcttca  | aaaggcaagg  | 720  |
| gggcccccca  | agtaggttaa  | tttacaacca  | taacggtaac  | gtggccaaaa  | gncaggcgag  | 780  |
| gaagggccgc  | aaggccgctg  | acatgcaagc  | tccgtccaag  | aagaatttgg  | gttggagggtg | 840  |
| aagagggtggg | gggacgaggt  | ttcntggggc  | ttgaacgccc  | cacattttaa  | aaaggcatcc  | 900  |
| tccacagact  | agactaacia  | ttccagaccc  | ccagtagtcc  | ctggctcaga  | aactcgagggc | 960  |
| gtgatttcgg  | cgtggcagcc  | caggcctggt  | actgacggct  | ggcgccctaga | agccgggggtc | 1020 |
| agggcggttg  | gcgcctcctg  | ggctgccctg  | cggggctcac  | ctctctcccc  | agcatggagg  | 1080 |
| ccccagggtcc | tgggagtgtg  | gctttgatga  | gggacaggaa  | aagtcccaac  | atcaggccaa  | 1140 |
| tgcttgactt  | cacttgcgctc | ggcgtctcag  | acggcacact  | gtcgggtttg  | agcaccceaag | 1200 |
| atgtacgttc  | tggacagaca  | ctatttttgtc | cccatacatg  | gagcggttcc  | tccgcacctt  | 1260 |
| gggcgcgcct  | gcgggagctg  | tgtcttttagg | tagttttttg  | ccctgcgcgc  | ccttttattct | 1320 |
| actccaagcg  | ctcttttgcca | aaccgcgact  | ccgcaaaagag | ccaagccctc  | cacatcccca  | 1380 |
| ttctcagcaa  | gtccacgcgt  | cccgcccagc  | ttcccgcccc  | cggttccctg  | taccagctag  | 1440 |
| ggcgtgaga   | agccaacgct  | tttccactga  | caaatectgt  | catccccagc  | tctagaaggc  | 1500 |
| gtccttaaac  | tgggccccgt  | ctgcctgccc  | ggactcctga  | attgtaagca  | aaataaaaact | 1560 |
| cctctctgca  | gtgttctggg  | gaatggagaa  | gaccccaagc  | tttcatcaga  | ccctcccaag  | 1620 |
| gagtgcgggg  | accagagaa   | atgaggccac  | cggggcagga  | tctggccatg  | tagctggcg   | 1680 |
| tctgaaaact  | ctggcagatt  | tgtctgactt  | ctgtgcccta  | ctctactgac  | cctgggctaa  | 1740 |
| aaatgatcat  | gatcacccca  | cttgccctgc  | ccttccccc   | cgcgctgac   | cgagccgcag  | 1800 |
| gggtgcccc   | ctggaagtcc  | ggcccagagg  | cctcagagaa  | atcctggcct  | agctgggctc  | 1860 |
| agaggagccc  | cgctccctg   | agagctaaac  | ctgggctagg  | accctgaaac  | ctcgagggtt  | 1920 |
| gcagaagcct  | gagggccttg  | ctgccaggca  | gggagggcac  | gggaaggagg  | gaggtgggat  | 1980 |
| cgatggcctc  | caaacagggg  | aaacaagggtg | gctggtagct  | ggggcactcc  | acaagacagg  | 2040 |
| tgtntcctgg  | gaagctgagc  | ttaccagctg  | ggattcctga  | tttatttcat  | tattaagggg  | 2100 |
| agaggcattt  | ccctggggag  | ggtactggca  | gtgactgatg  | ccccctggag  | ttgtgctgtg  | 2160 |
| cataacacta  | ctgtaggagg  | cagcaactcc  | tacccccact  | ggccatcact  | caccttgccc  | 2220 |
| ttactttcgt  | tgattcgccc  | agaagcaccc  | agagcctgcg  | gcatgattga  | ccctgtaggc  | 2280 |
| caagccaaa   | caaaccccc   | aattgtccag  | aattttcgcc  | ctggtgtatc  | cccaaagccc  | 2340 |
| agccctgtct  | tttccctatt  | tttccctatt  | gagatcttcc  | ctcatcccac  | cacctttagt  | 2400 |
| aataaagcct  | tctcaaaact  | aatttccctc  | ccaccgcttc  | ccaccccatc  | cctttttttt  | 2460 |
| cccatgctgg  | tttgggtgct  | gaggaatatt  | ttttcaaacc  | cacacccatc  | cagccctgcc  | 2520 |
| cagaggcctg  | actttgcatg  | cctctggtag  | gnttttcagg  | gttacattag  | ggagcaaaaag | 2580 |
| caggggtgcag | gggcaaaaag  | ggacccttcc  | aaatgggtcg  | tggccccctt  | aaaaaagctg  | 2640 |
| ggcagggntt  | tttttttttt  | tttttttttt  | tttttttttt  | ttttttgccc  | tatgactata  | 2700 |
| ttaggtgaca  | cgaaaactgct | catcgctcct  | gtcatcgagg  | ccctggccc   | aatggcaggc  | 2760 |
| tgagtecccc  | tctctggccc  | tggteccgcc  | tctctgccc   | cttgtgctca  | gcgctacctg  | 2820 |
| ctgcccggac  | acatccagag  | ctggccgacg  | ggtgcgcggg  | cgggcggcgg  | caccatgcag  | 2880 |
| ggaagctgcc  | aggggcccgtg | ggcagcgccg  | ccttctgccc  | cccacctggc  | gctgtgagac  | 2940 |
| tggcgctgcc  | accatgttcc  | ccagccctgc  | tctcacgccc  | acgcccttct  | cagtcaaaga  | 3000 |
| catcctaaac  | ctggaacagc  | agcagcgagc  | cctggctgcc  | gccggagagc  | tctctgccc   | 3060 |
| cctggaggcg  | accctggcgc  | cctcctcctg  | catgtggccc  | gccttcaagc  | cagaggccta  | 3120 |
| cgctgggccc  | gagggcgctg  | cgccgggccc  | cccagagctg  | cgcgagagc   | tgggcccgcg  | 3180 |
| gccttcaccg  | gccaaagtgtg | cgtctgcctt  | tcccgcgcgc  | ccgccttct   | atccacgtgc  | 3240 |
| ctacagcgac  | ccgaccccag  | ccaaggaccc  | tagagccgaa  | aagaaagggtg | aggaggaaac  | 3300 |
| acaggccccc  | ttctccctc   | ctgggtcgct  | tctgtcccca  | agaaactcag  | ggccaggagg  | 3360 |
| aggacacacg  | cgcccttggg  | ccgagggctg  | ggctgcggcg  | gggggttcag  | aatgtaagat  | 3420 |
| gcctgggtgtt | gtcgccagggc | tcccgcgcgc  | cgcgctccaat | cggagggttca | gaggaaatgc  | 3480 |
| cggattgaaa  | ggatccgaaa  | gcaagagacc  | aaaaaacttt  | tccccccggc  | ctaacaaacc  | 3540 |
| cccggcggtt  | tccgctctgc  | tcttggttct  | ggtagaattt  | taaaaatcgg  | tttatggtta  | 3600 |
| aacaaaacaa  | aaaaacagcc  | aaaacccccg  | tttttttacc  | cccccttggg  | ttttcaaacc  | 3660 |
| cttttttaaaa | tttttgaaaa  | aaaaccccca  | aacaaaatta  | aatttttttc  | cccaaaaat   | 3720 |
| tttttttttt  | aacaaaaggg  | gggggtggaaa | attttttttt  | tccccccccc  | aaaagggtt   | 3780 |
| tttgtttttt  | ttttttnttt  | tggcaaaaat  | gaattnttga  | ncnaggcctt  | attnnaaatg  | 3840 |
| gatattgggn  | ccncaggatt  | ttgatttcat  | ttattttttt  | aagcaaactt  | nccgggccc   | 3900 |
| caaggggaaa  | ggttccctcg  | tggaaaagta  | ggaaatgctg  | cgctaccgcg  | ggcacaaggn  | 3960 |

|            |             |             |            |            |             |      |
|------------|-------------|-------------|------------|------------|-------------|------|
| agtggacgag | atgagtgcgg  | gatcatcccg  | caggccatcc | caggatcggg | gagggagggc  | 4020 |
| ggccccgctg | cagaaagggg  | cttctgggag  | acccccagc  | ccaaggcagg | agccccggcg  | 4080 |
| attccccgga | ggcgcaggc   | gctggggcga  | gcgctgggcg | aagggccgct | gccagccggg  | 4140 |
| agagaattca | taggtttgtt  | gaggagcaga  | ggcctgggaa | caaattcggg | cgggcacggc  | 4200 |
| ggctagaact | gategctacc  | aattcgagga  | agccagcaag | gcaggttccg | aggccgcctg  | 4260 |
| cccaccgcga | gcttcttgga  | cactgcgcaa  | accctgctgc | ggccaggtcg | gagcctccga  | 4320 |
| tcaccaaacc | aacactccct  | ggccttctgt  | ttcttgattc | cttaattttg | agataagacc  | 4380 |
| gtccctagca | gtgaggcctc  | ggcctctgtt  | catttaactt | ctcaaaccac | actagcccta  | 4440 |
| attcagttca | ccccagagca  | tcacctgggt  | ttatttttat | ttttttat   | ttttatttat  | 4500 |
| tttttttttt | tttgacgctt  | gaaattttta  | gtcacctgtt | gtctccctca | ccagggtgtg  | 4560 |
| aactgccccg | agggcagaga  | cctcccgttt  | tgttttccag | cgccttgagc | cagcttgact  | 4620 |
| ttttacaaat | gctgagttag  | acgtgtcggt  | ggctcccagt | gcacttggca | gagttagccg  | 4680 |
| cagccagctg | ggcgctccag  | gcaggacaca  | gtggcctcca | cgaggatccc | ttaccattac  | 4740 |
| tgtgcggccg | cgtccgtag   | gtcaagccgc  | tcttaccag  | cgtctttctg | cctttctgtt  | 4800 |
| ccccctcaga | gctgtgcgcg  | ctgcagaagg  | cgggtggagc | ggagaagaca | gaggcggaca  | 4860 |
| acgcgagcg  | gccccgggcg  | cgacggcgga  | ggaagccgcg | cgtgctcttc | tcgcaggcgc  | 4920 |
| aggtctatga | gctggagcgg  | cgcttcaagc  | agcagcggtg | cctgtcggcc | cccgaacgcg  | 4980 |
| accagctggc | cagcgtgctg  | aaactcacgt  | ccacgcaggt | caagatctgg | ttccagaacc  | 5040 |
| ggcgctacaa | gtgcaagcgg  | cagcggcagg  | accagactct | ggagctgggt | gggctgcccc  | 5100 |
| cgcgcgcgcc | gcgcctgccc  | cgcaggatcg  | cggtgccagt | gctgggtgcg | gatggcaagc  | 5160 |
| catgcctagg | ggactcgggc  | ccctacgcgc  | ctgcctacgg | cgtgggcctc | aatccctacg  | 5220 |
| gttataacgc | ctaccccgcc  | tatccgggtt  | acggcggcgc | ggcctgcagc | cctggctaca  | 5280 |
| gctgcactgc | cgcttaccgc  | gcccggcctt  | ccccagcgca | gccggccact | gccgccgcca  | 5340 |
| acaacaactt | cgtgaacttc  | ggcgctcggg  | acttgaatgc | ggttcagagc | cccgggattc  | 5400 |
| cgcagagcaa | ctcgggagtg  | tccacgctgc  | atggtatccg | agcctggtag | ggaagggacc  | 5460 |
| cgcgtggcgc | gacctgagcc  | gatcccacct  | caacagctcc | ctgactctcg | tggggagaag  | 5520 |
| gggctcccaa | catgacctcg  | agtcaccttg  | attttgcatt | cactcctgcg | gagacctagg  | 5580 |
| aactttttct | gtcccacgcg  | cgtttgttct  | tgcgacgggg | agagtttgtg | gcggcgatta  | 5640 |
| tgcagcgtgc | aatgagtgat  | cctgcagcct  | ggtgtcttag | ctgtccccc  | aggagtgcct  | 5700 |
| tccgagagtc | catgggcacc  | cccggttgga  | actgggactg | agctcgggca | cgcagggcct  | 5760 |
| gagatctggc | cgcccattec  | gcgagccagg  | gccgggcgcc | cgggcctttg | ctatctcgcc  | 5820 |
| gtcgcgcgcc | cacgcaccca  | cccgtattta  | tgtttttacc | tattgctgta | agaaatgacg  | 5880 |
| atcccccttc | cattaaagag  | agtgcgttga  | ccccgcacgt | gtgcttcttt | cagcttgccg  | 5940 |
| cgcttcagaa | gcaggagaga  | ggtggccgcc  | cgggactggt | ctcagatctc | aggcacaggc  | 6000 |
| attccctgag | caaattgata  | acattgatac  | taataaaaac | taacccttgc | tggaaaccata | 6060 |
| ctggttccgt | gtcgggcact  | ttctgagatt  | gtctcatata | atcctcaata | atccaaaaaa  | 6120 |
| aaaaaaatcc | ttaagttttag | aagctgaggc  | cgggagaggt | ttaatgactt | acctgcgagc  | 6180 |
| aaatagccag | tactagtcca  | actctggtta  | aattcaggat | gcctcacttc | agagaccgcc  | 6240 |
| ttccctgtgc | tcccaagctc  | ccctccttga  | atccctaatg | gtgccaggca | cggttccagg  | 6300 |
| cactgggcat | taaatggaca  | agcaaaaaga  | cctgggccct | ctgtagctgg | agagcaccgt  | 6360 |
| gatcatccca | cttaaaaaga  | ctccttaacc  | tgttttccaa | atggnaaaaa | ccaagaancc  | 6420 |
| aaagcccttg | gnaagcggtt  | ctcaagggtc  | ctcanatgcc | ccaaatgcca | cgtcgggggc  | 6480 |
| tcaacanctn | gcccgttgga  | actgaatgcc  | nanngtgggc | cccaanaaag | gntcctgcgg  | 6540 |
| gatgngctc  | aactccaagc  | tgtggtgaag  | gcccataaaa | ttcaaattgg | ccaaggggag  | 6600 |
| ccccctaaag | ccctaaacct  | tenggggggtc | cnttccctaa | gggcatttaa | ntttacccaa  | 6660 |
| agtttggnca | aanaatgttt  | ccaatggncc  | ngattttatn | gangggnaaa | actgnggggc  | 6720 |
| aaccgaaatc | cagtttaaac  | ccgggttggt  | t          |            |             | 6751 |

<210> 6

<211> 478

<212> DNA

<213> Homo sapiens

<400> 6

|            |            |            |             |            |            |     |
|------------|------------|------------|-------------|------------|------------|-----|
| agagaaatca | ttacccgatt | cacaaagagc | atagagagtg  | taacagtcac | tgatcttggt | 60  |
| caaataggga | gagttttttt | tccttccctt | tttgtaaacac | ctgacccaca | ggactgacag | 120 |

|             |             |            |            |             |            |     |
|-------------|-------------|------------|------------|-------------|------------|-----|
| ttctaggaag  | cccccttacc  | cgaaaatagg | aaataaatcc | ttgccacctt  | gatttgcaag | 180 |
| ggcaatgcta  | atTTTTTTtct | ttctccagag | ctctcaaaaa | aaaaaaaaaa  | aaaaccttac | 240 |
| taaaaacagg  | gatccccggat | gtagcctcga | tgccccccat | taaaccggtaa | tatttcaggc | 300 |
| gtccgcctcac | actaatcttt  | caaactgtca | tcgcgagccg | cctggccagc  | agattcactt | 360 |
| aacagcgcctc | ccaggaccct  | cgttccgagc | tcttttcagc | gagacattta  | attgaatcgg | 420 |
| atgtggctcg  | tttgccagac  | gtcaccgcct | cggcgatagg | catcctctcc  | aacgacac   | 478 |

<210> 7  
 <211> 30  
 <212> DNA  
 <213> Mus musculus

|         |                                  |    |
|---------|----------------------------------|----|
| <400> 7 | tctctactcc gaattccgtc gtccacacct | 30 |
|---------|----------------------------------|----|

<210> 8  
 <211> 30  
 <212> DNA  
 <213> Mus musculus

|         |                                  |    |
|---------|----------------------------------|----|
| <400> 8 | aggtgtggac gacggaattc ggagtagaga | 30 |
|---------|----------------------------------|----|

<210> 9  
 <211> 30  
 <212> DNA  
 <213> Mus musculus

|         |                                  |    |
|---------|----------------------------------|----|
| <400> 9 | gggggcggct gggaaagcag gagagcactt | 30 |
|---------|----------------------------------|----|

<210> 10  
 <211> 21  
 <212> DNA  
 <213> Mus musculus

|          |                         |    |
|----------|-------------------------|----|
| <400> 10 | cgacggaart cggagtagag a | 21 |
|----------|-------------------------|----|

<210> 11  
 <211> 27  
 <212> DNA  
 <213> Mus musculus

|          |                               |    |
|----------|-------------------------------|----|
| <400> 11 | ttgaaggcgg ccagcatgca ggaggca | 27 |
|----------|-------------------------------|----|

<210> 12  
 <211> 25  
 <212> DNA  
 <213> Mus musculus

|          |                             |    |
|----------|-----------------------------|----|
| <400> 12 | acaggagcga cgggcagttc tgcgt | 25 |
|----------|-----------------------------|----|

<210> 13  
 <211> 24  
 <212> DNA

<213> Mus musculus  
 <400> 13  
 cggagcacca ggggcagaag aggc 24  
 <210> 14  
 <211> 25  
 <212> DNA  
 <213> Mus musculus  
 <400> 14  
 acaggagcga cgggcagttc tgcgt 25  
 <210> 15  
 <211> 20  
 <212> DNA  
 <213> Mus musculus  
 <400> 15  
 gagtgtctctg cctgatgatc 20  
 <210> 16  
 <211> 24  
 <212> DNA  
 <213> Mus musculus  
 <400> 16  
 ccagtctaga agcggatgatc gcc 24  
 <210> 17  
 <211> 21  
 <212> DNA  
 <213> Mus musculus  
 <400> 17  
 ccgtccgatg aaaaacagga g 21  
 <210> 18  
 <211> 21  
 <212> DNA  
 <213> Mus musculus  
 <400> 18  
 tctgtctcttc gttggctgat g 21  
 <210> 19  
 <211> 21  
 <212> DNA  
 <213> Mus musculus  
 <400> 19  
 ttaagttggg taacgccagg g 21  
 <210> 20  
 <211> 25  
 <212> DNA  
 <213> Mus msuculus



<400> 20  
aacttgctag gtagactagg ctggc

25